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CLEANING MEMBER

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TOOTHBRUSH WITH TONGUE CLEANING MEMBER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to oral hygiene products, and more
5 particularly, relates to a toothbrush having a tongue cleaning member
provided on the head section thereof.

2. Discussion of Related Art

Tongue cleaners have been in use for many years, with scraping type
devices being one of the more popular solutions for improved cleaning of the
10 tongue and soft cheek tissues. Scrapers exist as long, thin “blades” made of
either plastic or metal which are bent into a “U” shape and dragged across
the tongue.

Tongue scraper configurations with linear wiping elements have been
combined with toothbrushes in the past, as disclosed in U.S. Patents
15 5,818,856 and 6,119,296. Traditional tongue scrapers are formed of a tall
flat “blade” or ribbon of either plastic or metal, which is dragged along the
surface of the tongue. This type of construction is not well-suited for the
back of the toothbrush head as it makes contact with surfaces other than the
tongue. It has therefore been found desirable to provide a tongue scraper
20 provided on a toothbrush which is soft for contact with soft tissues and
without deep edges that might get caught on tooth surfaces.

Conventional tongue scrapers have also been inadequate with respect
to the cleaning capacity of the tongue and the soft tissue-cleaning surface.
The surface of the tongue is composed of many papillae with recesses
25 located between the papillae. Anaerobic bacteria tends to collect in the
recesses causing bad breath. Broad flat scraping blades or wipers are not
able to reach between the papillae where the bacteria has collected. It has
therefore been found desirable to provide a tongue scraper for a toothbrush
which provides for maximum penetration between papillae. In order to
30 provide the same kind of access into the mouth afforded by current
toothbrushes, it has further been found desirable to keep the height of the

toothbrush head (from toothbrush bristle tips to tongue cleaning tips) to a minimum.

The use of nylon bristles has been suggested for tongue cleaning in WO 0145573. While nylon bristles with small diameters are available, nylon is a very stiff material, particularly in short lengths. The use of nylon in bristles also makes the manufacturing processing complex. It has therefore been found desirable to provide a tongue cleaner for a toothbrush which is made of a relatively soft material for gentle cleaning, and minimizes manufacturing complexities.

OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide a tongue cleaner for a toothbrush which overcomes the aforementioned deficiencies of the prior art.

It is also an object of the present invention to provide a tongue scraper provided on a toothbrush which is soft for contact with soft tissues and without deep edges that might get caught on tooth surfaces.

It is a further object of the present invention to provide a tongue scraper provided on a toothbrush which provides for maximum penetration between papillae.

It is yet another object of the present invention to provide a tongue scraper for a toothbrush which keeps the height of the toothbrush head (from toothbrush bristle tips to tongue cleaning tips) to a minimum.

It is still a further object of the present invention to provide a tongue scraper for a toothbrush which is made of a relatively soft material for gentle cleaning and minimizes manufacturing complexities.

Various other objects, advantages and features of the present invention will become readily apparent from the ensuing detailed description and the novel features will be particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

The present invention relates to a toothbrush having a handle portion formed with a neck at one end thereof and which extends along a first longitudinal axis. A head section is coupled to the neck. The head section includes a plurality of first cleaning members provided on a first head side thereof and which extends outwardly from the first head side generally perpendicular to the first longitudinal axis. The head section further includes a second cleaning member provided on a second head side thereof opposite to the first head side. The second cleaning member includes a plurality of flat tipped conical shaped cleaning elements for cleaning the tongue surface which extend outwardly from the second head side of the head section generally perpendicular to the first longitudinal axis.

In a preferred embodiment, the second cleaning element is molded of a relatively soft elastomeric material. This elastomeric material preferably has a hardness within the range of A8 to A25 Shore hardness.

In this toothbrush, the conical shaped cleaning elements of the second cleaning member are in the shape of short thin whiskers, and have tips at an end thereof which are less than 0.1mm in diameter for optimum tongue cleaning penetration. Each of the flat tipped conical shaped cleaning elements has a height which is within the range of preferably 0.020" to 0.100", and most preferably 0.040" to 0.060".

In another embodiment, the toothbrush of the present invention includes a handle portion being formed with a neck at one end thereof and which extends along a first longitudinal axis. A head section is coupled to the neck and includes a plurality of first cleaning members provided on a first head side thereof and which extends outwardly from the first head side generally perpendicular to the first longitudinal axis.

The head section further includes a second cleaning member provided on a second head side thereof opposite to the first head side. The second cleaning member includes a plurality of grated cleaning elements for

cleaning the tongue surface which extend outwardly from the second head side of the head section generally perpendicular to the first longitudinal axis.

These grated cleaning elements can be shaped in a variety of preferred configurations including: (1) a front cleaning face formed of a generally concave cleaning surface; (2) a front cleaning face having a pair of dispersion grooves having an inclined cleaning plane disposed therebetween; (3) a front cleaning face formed of a generally concave cleaning surface and a rear cleaning face having a pair of dispersion grooves having an inclined cleaning plane disposed therebetween; (4) a front cleaning face formed of a generally concave cleaning surface with a portion thereof extending below a base portion of the second cleaning member; and (5) a front cleaning face having a cut-out grooved arc segment having a bottom surface which is inclined so as to extend below a base portion of the second cleaning member. In addition, to allow for flexure of the grated cleaning elements for enhanced cleaning and scraping capabilities, the second cleaning member is molded of a relatively soft elastomeric material.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

For a more complete understanding of the invention, reference is made to the following description and accompanying drawings in which:

- Fig. 1 is a top perspective view of a preferred embodiment of a toothbrush in accordance with the teachings of the present invention;
- Fig. 2 is a bottom perspective view of the toothbrush of Fig. 1;
- Fig. 3 is an enlarged front perspective view of the head section of the toothbrush of Fig. 1;
- Fig. 4 is an enlarged bottom perspective view of the head section of Fig. 1;
- Fig. 5 is a schematic representation of each whisker of the tongue cleaner of the toothbrush of Fig. 1;
- Fig. 6 is a schematic representation of the whisker of Fig. 5 cleaning the tongue papillae;

Fig. 7 is a rear perspective view of the neck and head section of another preferred embodiment of a toothbrush in accordance with the teachings of the present invention;

Fig. 8 is an enlarged rear elevation view of the tongue cleaner provided on the rear side of the toothbrush of Fig. 7.

Figures 9 through 13 show alternate preferred embodiments for the grated cleaning elements for the tongue cleaner of Figure 8.

**DETAILED DESCRIPTION OF CERTAIN
PREFERRED EMBODIMENTS OF THE INVENTION**

Referring now to Figure 1, an exemplary toothbrush according to a first embodiment of the invention is illustrated and generally indicated at 100.

Toothbrush 100 includes a handle 102 at a proximal end thereof and a brush section 104 that is defined by a neck 110 that terminates in a head section 120 at a distal end of toothbrush 100. Handle 102 has a free proximal end 108 and an opposite neck end 106 and extends along a first longitudinal axis a-a. Neck 110 generally includes a first end 114 and a second end 116 with first end 114 being located at neck end 106 of handle 102 and the second end 116 being located at head 120. In other words, neck 110 is the portion of toothbrush 100 that extends between handle 102 and head 120.

It will be further appreciated that the illustrated shapes of handle 102 and neck 110 are merely exemplary in nature and handle 102 and/or neck 110 can be formed to have any number of shapes. Preferably, the shapes of handle 102 and neck 110 are ergonomically pleasing to a user of toothbrush 100 and provide a toothbrush that is easily gripped and held and easily manipulated by a user. For example, handle 102 may include slightly recessed finger sections which are formed on opposite sides of handle 102.

One recessed finger section is designed to receive the thumb of one hand and the other recessed finger section is designed to receive one or more other fingers of the same hand to thereby assist a user in proper placement of

toothbrush 100 in a user's hand. One or more recessed finger sections 118 may include ribs or another type of roughened surface to assist a user in gripping toothbrush 100 at recessed finger section 118.

Although not shown in Figures 1 through 4, the head section 104
5 includes a top cavity and a bottom cavity. A plurality of first cleaning members 130 are provided on the front head side 132 generally perpendicular to the first longitudinal axis a-a of the handle portion 102.

As best shown in Figure 3, the first cleaning elements 130 include a variety of bristle members, which can be used for wiping, cleaning and
10 massaging, etc. the user's teeth and gums. These include first bristle members 132a-o, which are preferably in the form of upstanding cylindrical bristle members, second bristle members 134a-d, which are preferably in the form of outer peripheral arc bristle members, and third bristles members, such as 136a-f, which are preferably in the form of centrally located arc
15 members which form a circular pattern. Second bristle members 134a and b respectively extend from the top and bottom ends 133 and 135 of the top face of the head section 120. Second bristle members 134c and d respectively extend from the central side portions of the outer periphery of the top face of the head section 120. First bristle members 132a-l extend outwardly from
20 the outer peripheral edge of the top face of the head section 120 and are each disposed between one of the end second bristles members 134a and b and one of the centrally disposed second bristle members 134c and d. A set of four of the third bristle members, such as 136a-f, respectively form a circular array which circumscribes first bristle members 132m-o and extend from the
25 central portion of the top face of the head section 120.

In accordance with a general object of the present invention, a second cleaning member 140 is placed within the bottom cavity of the head section 120 of the toothbrush 100 which, as will be described in more detail below, is soft for contact with soft tissues of the tongue and is without deep edges
30 that might get caught on tooth surfaces. This second cleaning member 140 is thus provided on a head side which is opposite to the head side on which the

first cleaning member 130 is disposed. As such, the second cleaning member 140 is able to take advantage of the presence of dentifrice used during toothbrushing, the ingredients of which have been commonly found to have beneficial effects in the treatment of bad breath. In addition, this
5 minimizes the need for extra steps in one's oral care regiment with a single area of the brush to be cleaned after use.

As is best shown in Figures 4 and 5, the second cleaning member 140 includes a plurality of flat-tipped conical-shaped cleaning elements, such as 142a-d, for cleaning the tongue surface which extend outwardly from the
10 bottom head side 143 of the head section 120 generally perpendicular to the first longitudinal axis a-a of the handle portion 102 of the toothbrush 100. These flat-tipped conical-shaped cleaning elements preferably are in the shape of soft, thin whiskers which are injection molded as described below and made of a flexibly resilient thermoplastic material to achieve the softness
15 desired for gentle cleaning and to minimize manufacturing complexities.

Figure 6 illustrates that for optimal penetration between papillae 210 of the user's tongue 200, the tip 144 of each of the plurality of conical-shaped cleaning elements 142a-d is preferably no more than approximately 0.5 mm in diameter, and most preferably no more than approximately 0.2
20 mm in diameter. In a preferred embodiment, the tip 144 of each of the plurality of conical-shaped members 142a-d is 0.13 mm in diameter. The tip 144 is preferably generally flat to obtain superior scraping action on the tongue surface. Moreover, the overall height of the toothbrush head section 120 (from the brush bristle tip of first cleaning member 130 to the tips of the
25 conical-shaped cleaning elements 142a-d) has been kept to a minimum to provide the same kind of access in the mouth provided by a conventional toothbrush. In order to achieve this minimal height, the height H (see fig. 5) of each of the flat-tipped conical-shaped cleaning member 142a-d is less than approximately .100" as that height is sufficient to reach the bottom 212 of
30 the spaces 214 between the papillae. Most preferably, each of the flat-tipped

conical-shaped cleaning elements has a height H which is within the range of 0.020" to 0.100", and most preferably between 0.040" to 0.060".

5 The second cleaning member 140 is made of a relatively soft elastomeric material which is resiliently flexible. This material allows a dense population of short "whisker" cleaning members 142a-d across the entire rear surface of the toothbrush head section, and results in a more soft and desirable mouth feel. In order to obtain this beneficial cleaning result, the second cleaning member 140 is made of an elastomeric material having a hardness which is within the range of Shore A8 to Shore A25 hardness.

10 The flat-tipped design of the conical-shaped members 142a-d combined with the resilient and flexible nature of the elastomeric material selected provides for improved inter-papillae scraping. As the cleaning members 142a-d are made of a soft elastomer, they will flex or bend sideways as pressure is applied causing the edge of the flat tips 144 to scrape the debris trapped in the desired areas of the tongue surface. Moreover, 15 when in the angled or flexed position, the edge of the flat tip 144 is in contact with the tongue resulting in greater force per square inch, as the force is distributed over less surface area.

In addition, the conical-shaped members 142a-d have been disposed 20 in a predetermined pattern on the bottom head side 143 of the head section 120 so as to provide for a high density of the conical shaped members 142a-d per square mm of the bottom head side 143. Each conical shaped member 142a-d is spaced apart from an adjacent conical shaped member at a preferred spacing range of approximately 0.020 m to 0.120", more preferably 25 at a spacing of approximately 0.030" to 0.100", and most preferably at a spacing of approximately 0.040" to 0.080". In one preferred embodiment, each conical shaped member, such as 142a-d, is spaced from an adjacent conical-shaped member at a spacing of approximately 0.050". Moreover, in order to provide the desired density for optimum cleaning, the second 30 cleaning member 140 includes preferably approximately 100 to 600 conical-shaped members 142a-d per square inch, and more approximately 200 to 500

conical shaped members per square inch, and most preferably 300 to 450
conical-shaped members per square inch. In a preferred embodiment,
optimum cleaning is provided by placing approximately 400 conical-shaped
member per square inch on the second cleaning member 140. This high
5 density feature coupled with the relatively small height of the conical shaped
members 142a-d permits the second cleaning member 140 to tend to conform
to the many papillae of the tongue surface to provide better cleaning
efficiently.

This toothbrush 100 can be manufactured by three methods; namely,
10 IMT, AFT and conventional staple technology. IMT and AFT are
generically known in the art as “anchor free tufting technologies.” In an
AFT manufacturing process, the third bristle members, such as 136a-f, of the
first cleaning members 130 are injection molded from a first shot of
elastomeric material and then a hot adhesive melt is applied within the top
15 cavity to capture the base of each of the third bristle members 136a-f so that
they extend outwardly from the front head side 132 as described above. The
second cleaning member 140 is then formed in the AFT process by injection
molding a separate second shot of elastomeric material, and securing the
second cleaning member 140 in the bottom cavity of the brush head by a hot
20 adhesive melt.

In the IMT and conventional staple technologies, the third bristle
members, such as 136a-f, of the first cleaning member 130 and the second
cleaning member 140 are injection molded by the same shot of elastomeric
material flowing through the brush head. Therefore, cleaning features are
25 formed on opposite sides of the brush head by injection molding by a single
operation (i.e., one shot of elastomeric material).

In each of the AFT, IMT or conventional staple technology
processes, the elastomer used may be an elastomer used elsewhere in the
handle, such as used for a grip material, or it can be different therefrom.

30 An alternate preferred embodiment for a toothbrush having cleaning
elements on both sides of the head section is shown in Figures 7 and 8. The

construction of the toothbrush shown in Figures 7 and 8 is the same as that shown and described in the embodiment of Figures 1 through 6 except for the design of the second cleaning element 310 provided on the rear surface 305 of the head section 310 of the toothbrush. Like reference numerals from
5 Figures 1 through 6 have been used in Figures 7 through 8 to designate like features in the embodiments.

Instead of employing flat-tipped conical-shaped cleaning elements as in the previously-described embodiment, the second cleaning element 310 includes a plurality of randomly disposed grated cleaning elements 320 for
10 cleaning the tongue surface which extend outwardly from the second head side 305 of the head section 310 general perpendicular to the first longitudinal axis a-a. The second cleaning member 310 and the grated cleaning elements 320 associated therewith are made as well of a flexibly resilient elastomeric material to achieve the softness desired for gentle
15 cleaning and to minimize manufacturing complexities. In order to obtain beneficial cleaning results, the second cleaning member 310 is made of an elastomeric material having a hardness which is within the range of Shore A8 and Shore A25 hardness.

Figures 9 through 13 show alternate preferred embodiment for the
20 grated cleaning elements 320 for the second cleaning member 310. In Figure 9, the grated cleaning element 320a has a front cleaning face 330 formed of a generally concave cleaning surface 332. The grated cleaning element 320b in Figure 10 has a front cleaning face 340 which includes a pair of dispersion grooves 342 and 344 having an inclined cleaning plane 346 therebetween.
25 Figure 11 illustrates that the grated cleaning element 320c can have a front cleaning face 350 which is formed of a generally concave cleaning surface 352 and a rear cleaning face 354 including a pair of dispersion grooves 355 and 356 having an inclined cleaning plane 358 therebetween. In Figure 12, the grated cleaning element 320d has a front cleaning face 360 formed of a
30 generally concave cleaning surface 362 with a portion 364 thereof extending below a base portion 366 of the second cleaning member 310. Figure 13

illustrates that the grated cleaning element 320e can have a front cleaning face 370 including a cut-out grooved arc segment 372 which is inclined so as to extend below a base portion 375 of the second cleaning member 310. Each of these embodiments for the grated cleaning element 320 provides for improved inter-papillae scraping.

In addition, the overall height of the toothbrush head section has been kept to a minimum in the toothbrush of Figures 7 through 13 to provide the same kind of access in the mouth provided by a conventional toothbrush. Therefore, the height of each of the grated cleaning elements 320 is less than approximately 1mm as that height is sufficient to reach the bottom of the spaces between the papillae. Most preferably, each of the grated cleaning elements 320 has a height H which is within the range of 0.020" to 0.100", and most preferably 0.040" to 0.060".

Accordingly, the toothbrush of the present invention provides a second cleaning element opposite to the bristle side of the toothbrush for cleaning the tongue surface which is soft for contact with soft tissues and without deep edges that might get caught on tooth surfaces. In addition, this toothbrush provides for maximum penetration between papillae along the tongue surface. Moreover, this toothbrush with tongue scraper maintains the height of the toothbrush head to a minimum. Further, a cleaning member for the tongue surface is provided for a toothbrush which is made of a relatively soft material for gentle cleaning and minimization of manufacturing complexities.

Although the invention has been particularly shown and described with reference to certain preferred embodiments, it will be readily appreciated by those of ordinary skill in the art that various changes and modifications may be made therein without departing from the spirit and scope of the invention. It is intended that the appended claims be interpreted as including the foregoing as well as various other such changes and modifications.